10 MINUTE SCHOOL

Robotics for Kids

Arduino Board

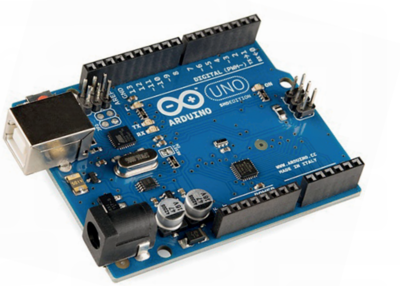
Index

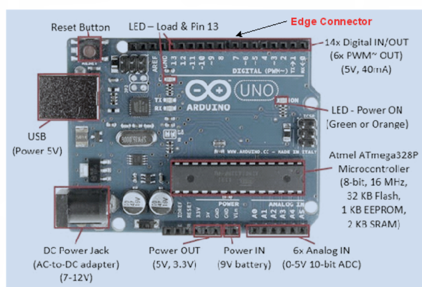
- UNO Board
- Specification
- Power supply
- Input and output
- Memory and communication
- Arduino programming
- Pin details
- Connecting board and chip

Arduino Board

UNO Board

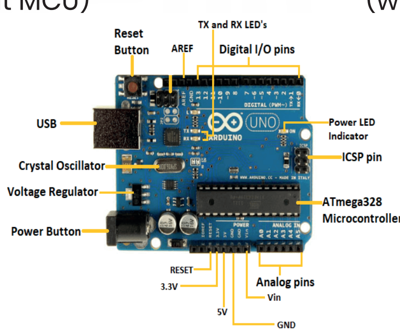
The Arduino Uno is one kind of microcontroller board based on ATmega328, and Uno is an Italian term which means one. Arduino Uno is named for marking the upcoming release of microcontroller board namely Arduino Uno Board 1.0. This board includes digital I/O pins-14, a power jack, analog i/ps-6, ceramic resonator-A16 MHz, a USB connection, an RST button, and an ICSP header. All these can support the microcontroller for further operation by connecting this board to the computer. The power supply of this board can be done with the help of an AC to DC adapter, a USB cable, otherwise a battery





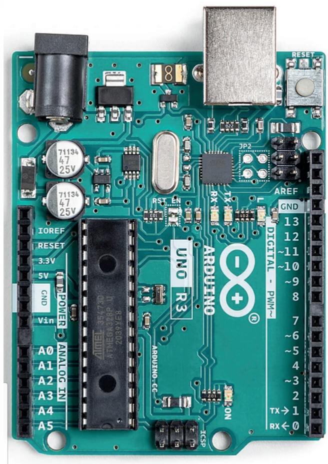
Arduino Board (without MCU)

Arduino Board (with MCU)



Arduino Board

Specification

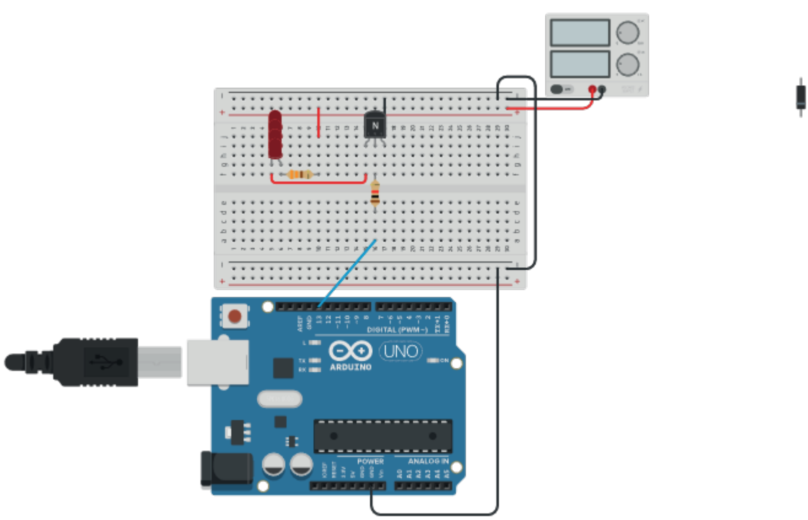


Position	Pot (Positive number)	*A0* (PIN)
Most Right	1	1023
Most Left	0	0
Middle	5	511

Arduino Board

Power Supply

The **Arduino Uno power supply** can be done with the help of a USB cable or an external power supply.
The external power supplies mainly include AC to DC adapter otherwise a battery.
The adapter can be connected to the Arduino Uno by plugging into the power jack of the Arduino board.
Similarly, the battery leads can be connected to the Vin pin and the GND pin of the POWER connector.
The suggested voltage range will be 7 volts to 12 volts.



Arduino Board

Input & Output

The 14 digital pins on the Arduino Uno can be used as input & output with the help of the functions like pinMode(), digitalWrite(), & Digital Read()

- **Pin1 (TX) & Pin0 (RX) (Serial):** This pin is used to transmit & receive TTL serial data, and these are connected to the ATmega8U2 USB to TTL Serial chip equivalent pins.
- **Pin 2 & Pin 3 (External Interrupts):** External pins can be connected to activate an interrupt over a low value, change in value.
- **Pins 3, 5, 6, 9, 10, & 11 (PWM):** This pin gives 8-bit PWM o/p by the function of analogWrite().
- **SPI Pins (Pin-10 (SS), Pin-11 (MOSI), Pin-12 (MISO), Pin-13 (SCK):** These pins maintain SPI-communication, even though offered by the fundamental hardware, is not presently included within the Arduino language.
- **Pin-13(LED):** The inbuilt LED can be connected to pin-13 (digital pin). As the HIGH-value pin, the light emitting diode is activated, whenever the pin is LOW.
- **Pin-4 (SDA) & Pin-5 (SCL) (I2C):** It supports TWI-communication with the help of the Wire library.
- **AREF (Reference Voltage):** The reference voltage is for the analog i/ps with analogReference().
- **Reset Pin:** This pin is used for reset (RST) the microcontroller.

Arduino Board

Memory and communication

Memory
The memory of this Atmega328 Arduino microcontroller includes flash memory-32 KB for storing code, SRAM-2 KB EEPROM-1 KB.
Communication
The Arduino Uno ATmega328 offers UART TTL-**serial communication**, and it is accessible on digital pins like TX (1) and RX (0).
It has a serial monitor that permits easy data. There are two LEDs on the board like RX & TX which will blink whenever data is being broadcasted through the USB.
A SoftwareSerial library permits for serial communication on Arduino Uno digital pins and the ATmega328P supports TWI (I2C) as well as **SPI-communication.**
The Arduino software contains a wired library for simplifying the utilization of the I2C bus.

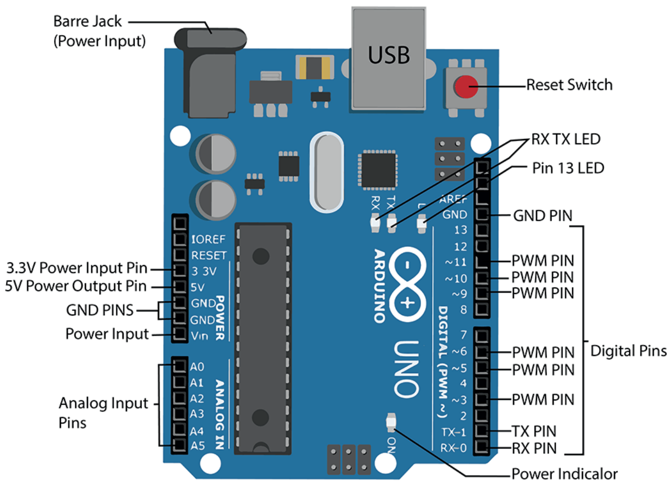
Arduino Programming

Once the Arduino IDE tool is installed in the PC, attach the Arduino board to the computer with the help of USB cable. Open the Arduino IDE & select the right board by choosing Tools–>Board..>Arduino Uno, and select the right Port by choosing Tools–>Port. This board can be programmed with the help of an Arduino **programming language** depends on Wiring.

To activate the Arduino board & flash the LED on the board, dump the program code with the selection of Files–> Examples..>Basics..>Flash. When the programming codes are dumped into the IDE, and then click the button 'upload' on the top bar. Once this process is completed, check the LED flash on the board.

Arduino Board

Pin details



Connecting board and chip

